Fact Sheet:

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UTILITIES ENGINEERED MANAGEMENT SYSTEMS (EMS) SUITE

The Problem

Declining maintenance budgets and reductions in force (RIFs) have made it increasingly difficult for Army Directorates of Public Works (DPWs) to operate and maintain the Army's aging utility distribution systems so that they perform safely and efficiently. This is particularly a concern for utilities in which corrosion is the chief mechanism of deterioration. The Army has more than 12,000 miles of water distribution piping, over 4,000 miles of natural gas distribution piping, and over 3,000 miles of heat distribution piping. Improper repair decisions for these systems can result in (1) excessive operating costs, (2) shortened system life, (3) high energy losses, or (4) violations of environmental and safety regulations. In FY96, the Army spent $335 million on the maintenance of utilities and $1.3 billion on the operation of utilities. In addition, energy losses from heat distribution systems cost the Army an estimated $49 million per year.

It is therefore very important to allocate utility maintenance dollars to the areas where they will be the most beneficial or to where they are most urgently needed. It is also important to select the repair/replace option which is best suited to each situation. This is a challenging problem because (1) the condition of most buried utilities is unknown until there is a failure, (2) the consequences of delaying one project to work on another are often unknown, (3) the information needed to make a good decision may be unavailable or difficult to locate and assemble, (4)

there are many possible alternatives from which to choose, and (5) many factors must be considered in the decision.

The Technology

The U.S. Army Construction Engineering Research Laboratories (CERL) is developing a microcomputer-based software suite called the Utilities EMS Suite. Utilities EMS's will provide Army installations with tools for integrated maintenance and repair (M&R) planning for utility systems and will assist the DPW in determining when and where maintenance should be performed, and in selecting the best alternative.

The software suite consists of several utility Engineered Management Systems (EMSs), which will include inventory databases, condition assessment methods, condition indexes, condition prediction models, prioritization tools, and decision making tools. The use of shared data (such as soil characteristics), common utility data analysis tools (such as cathodic protection analysis), and prediction models will be emphasized. This will eliminate redundant data entry and the need to coordinate reports and analyses from multiple sources. Utility project prioritization and decision-making tools will include consequence analysis, life-cycle cost, and conflict resolution. The tools will be integrated with computer-aided design (CAD) and/or geographic information systems (GIS) to enable easy updating of both maps and databases. Knowledge of utility maintenance procedures required by regulations will be embedded in the system. Interfaces with automated data collection tools such as Supervisory Control and Data Acquisition (SCADA) systems will be investigated.

Benefits/Savings

The Utilities EMS Suite will enable Army installation managers to make cost-effective, technically feasible decisions about the maintenance of utility distribution systems. This will help reduce life-cycle costs, conserve water and energy, and ensure that safety and environmental requirements are met for high-risk utilities.

Status

Heater, sewer, and waste distribution modules of the suite are currently under development. A beta test version of the heat distribution module, HEATER has been completed.

Points of Contact

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